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Transmitter Type	Reply Frequency
Colpitts Oscillator	Tank resonant frequency when transceiver operates in isolation; any stack resonant frequency when within a stack; between tank resonant frequency and stack resonant frequency when loosely coupled to a stack (e.g., on an end or in non-coplanar orientation).
Phase Locked Loop	As driven by carrier from monitor 124 (e.g., at an isolated tank resonant frequency, a stack resonant frequency, or any other desirable frequency). The carrier frequency may be selected for any one or more of the following reasons: (a) to avoid the carrier being masked by interfering frequency components (e.g., of antenna system 121, or of signal 193); (b) to avoid the reply being masked by interfering frequency components (e.g., of antenna system 121 or of signal 193); (c) to assure adequate power transfer to enable one or

Transmitter Type	Reply Frequency
A3	more transceivers; and (d) to prevent adequate power transfer or adequate received signal quality from enabling one or more transceivers not currently of interest. For example, if a stack resonant frequency has been detected at 4.3 MHz, the monitor may transmit at a predetermined offset (e.g., less 500 KHz) from 4.3 MHz to interrogate a transceiver loosely coupled to the stack (e.g., at an end of a linear stack) whether or not a response (e.g., a ring signal) was detected at that offset.

Replace the paragraph starting on page 58, line 30 with the following paragraph:

TABLE 7

Command/Answer	Description
N <Antenna Node> <Antenna Address> <Antenna Mode> <Gain> <Frequency>	Direct the set up and selection of antennas for a monitor to use in a specified mode (e.g., transmit, receive, test). Set antenna node RF channel operating parameters. Specify a frequency for antenna node tuner to use to tune the selected antenna(s).
No answer.	An acknowledge answer may be used.
G <Squelch delay> <Squelch width> <Receive delay> <DSP Start-up Delay> <DSP Sample Count> <DSP Mode> <Ch. A Mode> <Ch. A Signal Source> <Ch. A Gain> <Ch. A Filtering> <Ch. A Clock> <Ch. A Output> {etc. for Ch. B}	Specify Monitor receiver operating parameters and analog switch settings. Squelch delay facilitates beginning squelch at a zero crossing of energy on the antenna(s) to be squelched. Squelch width corresponds to duration D434. Receive delay may direct beginning receiving on or after the T416 (e.g., at times A or B as discussed above). DSP sample count conveys

### Command/Answer

### Description

No answer.

C {Ch. A antenna arguments} {Ch. B antenna arguments} <Start frequency> <End frequency> <Frequency stepping>

$\{ \langle \text{Ch. A Detector Output at Bin } p \rangle \} \dots$   
 $\{ \langle \text{Ch. B Detector Output at Bin } q \rangle \} \dots$

O {<Header> <Level> <Access Code>} ...

the number of samples to be taken (e.g. 32 :sec window for FFT calculation). DSP mode may be as defined by an integrated circuit DSP (e.g., TI320 marketed by Texas Instruments). Ch. A/B mode may direct transmit, receive, or both (loop back) Ch. A/B Signal Source may select same source for two receive channels. Ch. A/B clock source may direct frequency and phase (e.g., 0°, +90°) for signal SC. Ch. A/B output may direct which of several detectors is/are used.

An Acknowledge answer may be used.

Directs the set up and selection of antennas for each (e.g., A and B) receiver in the Monitor with arguments similar to N command.

Requests amplitude results (e.g., received amplitude or received power) from each receiver in a specified range of frequencies (i.e., bins) by specifying the bin number range to be reported (e.g., from bin 123 to bin 885).

May specify an increment between bins (e.g., report every fifth bin).

Reports up to 1024 amplitude values for each channel (e.g.,  $p = 0$  to 1023; and  $q = 0$  to 1023). May substitute DSP output when FFT results are desired.

Interrogate a group, subgroup, or particular transceiver. The list Header may define a sequence and number of arguments (e.g., level



Command/Answer	Description
<p>A &lt;Antenna Node Address&gt;</p> <p>&lt;Antenna Node Address&gt; &lt;Answer Data Length&gt; &lt;Answer Data&gt; &lt;Checksum&gt;</p>	<p>Read status of input register(s) (e.g., manual switches), status of output register(s) (e.g., current matrix switch settings, squelch settings, tuner settings, RF channel settings, feedback settings, any memory address (e.g., antenna node software version, tuner calibration date, number of installed antennas, etc.)).</p> <p>Several different commands may be used to obtain status in part.</p>
<p>B &lt;Antenna Node Address&gt; &lt;Settings Data Length&gt; &lt;Settings Data&gt; &lt;Checksum&gt;</p> <p>No answer.</p>	<p>Set output register(s) contents to specify antenna configuration, antenna(s) coupling to transceiver channel(s), squelch settings for each channel, tuner settings for each channel, feedback settings for each channel.</p> <p>An Acknowledge answer may be used.</p>
<p>C &lt;Antenna Node Address&gt; &lt;Configuration Data Length&gt; &lt;Configuration Data&gt; &lt;Checksum&gt;</p> <p>No answer.</p>	<p>Set configuration data in memory including antenna node address, antenna addresses, function(s) to be executed on manual switch closure, table of tuning settings (e.g., relay closures vs. frequency), table of antenna settings (e.g., relay closures vs. frequency or configuration identifier), any memory address (e.g., tuner calibration date, number of installed antennas, etc.).</p> <p>Several different commands may be used to specify configuration in part. An Acknowledge answer may be used.</p>

Replace the paragraph starting on page 67, line 8 with the following paragraph:

ab  
Output register 2910 receives data from data bus 2906, stores such data, and maintains output signals in accordance with stored data. Signals provided by output register 2910 direct operation of coupler 2912 and transceive channels 2918. Output register signals on line 2913 control coupler 2912 (e.g., configuration and matrix switch operations). Squelch command signals on line 2921 direct antenna squelching functions of squelch circuit 2920. Tuning signals on line 2923 direct tuning functions of tuner 2922. Finally, digital signals on line 2927 control operation of transceiver channels 2924 (e.g., specifying preamplifier gain, automatic gain control, and filter transfer functions). Output register signals on lines 2913, 2921, 2923, and 2927 are binary digital signals and may be used in common across multiple transceive channels 2918, or additional digital signals may be provided by output register 2910 for each transceive channel.

Replace the paragraph starting on page 74, line 10 with the following paragraph:

a7  
Antenna 3401 is constructed in the plane defined by points A, B, C, D, i.e., in a plane parallel to the XZ plane at the opening of the passage furthest on the Y axis from origin 3510. Antenna 3402 is parallel to antenna 3401 yet closer to origin 3510. Movement of a transceiver along an axis through the passage parallel to the y axis may be determined by examination of the time when the peak reply signal strength is received from each of antennas 3401 and 3402. Antenna 3403 is again parallel to the XZ plane and in addition exists at the mid-point of the passage (e.g., each point J, K, L, exists at the mid-point of a segment NB, OC, PD parallel to the Y axis). Antenna 3404 may be arranged at an angle  $\alpha = 45^\circ$  when passage 3500 is essentially cubic in geometry. Similarly, antenna 3405 may be perpendicular to antenna 3404 when passage 3500 is essentially cubic. Antenna 3406 is oriented in a plane having angles  $\alpha = 135^\circ$  and  $\gamma = 135^\circ$  and is of the type described in related patent application S/N 09/233,755, cited above. Antenna 3407 has an orientation complimentary to antenna 3406. Antenna 3408 lies in a plane parallel to the ground plane 3501. Antenna 3409 and antenna 3410 are parallel to the YZ plane and may be constructed in sides 3506 and 3507, respectively.

Replace the paragraph starting on page 74, line 24 with the following paragraph:

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